Ordering number: EN 1410B

Monolithic Digital IC

No.1410B

LB1403N SERIES

5-Dot Red/Green LED Level Meter

Use

- AC level meters such as VU meters.
- DC level meters such as signal meters.

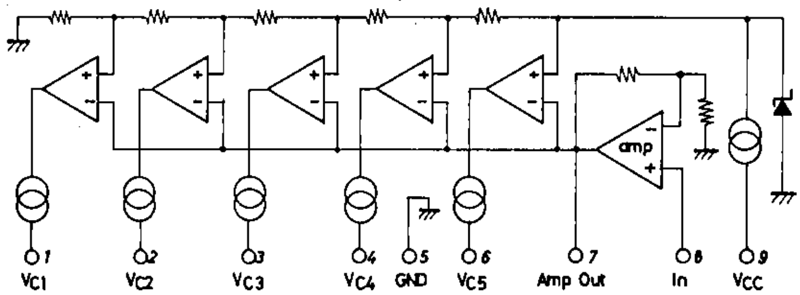
Features and Functions

- Capable of generating a bar-display for input voltage with 5 LEDs.
- Operates from either AC or DC input voltage because of on-chip rectifier amplifier.
- Lighting levels remain stable to line regulation because of on-chip voltage reference.
- LEDs are driven by a constant current ; stable to line regulation.
- Power supply voltage range is wide (3.5 to 16V), for a wide range of applications.
- Five types of ICs constitute the series with various lighting levels of the LEDs and driving currents.
- SEP-9 pin package and fewer externally connected components result in smaller space requirements on the circuit board.
- Low noise at LED lighted mode

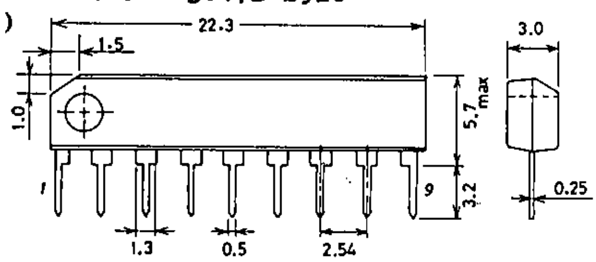
LB1403N Series

Type No.	V_{C3} lighting sensitivity	Comparator level	Constant LED current
LB1403N	85 mVrms typ	+6dB,+3dB,0dB,-5dB,-10dB	15 mA typ
LB1413N	105 mVrms typ	1.67Vc3,1.33Vc3,Vc3,0.67Vc3,0.33Vc3	15 mA typ
LB1423N	85 mVrms typ	+6dB,+3dB,0dB,-5dB,-10dB	7 mA typ
LB1433N	105 mVrms typ	1.67Vc3,1.33Vc3,Vc3,0.67Vc3,0.33Vc3	7 mA typ
LB1443N	85 mVrms typ	+6dB,+3dB,0dB,-6dB,-12dB	15 mA typ

Equivalent Circuit Block Diagram and Pin Assignment



Package Dimensions 3017B-S9IC
(unit: mm)



SANYO: SEP9

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Absolute Maximum Ratings[LB1403N,1413N,1423N,1433N,1443N] at Ta=25°C

			unit
Maximum Supply Voltage	V_{CC} max	18	V
Allowable Power Dissipation	Pd max	1100	mW
Operating Temperature	Topr	-25 to +75	°C
Storage Temperature	Tstg	-55 to +125	°C

Allowable Operating Conditions[LB1403N,1413N,1423N,1433N,1443N] at Ta=25°C

		min	typ	max	unit
Supply Voltage	V_{CC}	3.5	6	16	V

Electrical Characteristics[LB1403N] at Ta=25°C,V_{CC}=6V,f=1kHz

			min	typ	max	unit
Current Dissipation	I_{CC}	V_{IN}=0		5	8	mA
Sensitivity	V_{IN}	Vc3 on-level	74	85	96	mVrms
Comparator Level 1	Vc1		-11.5	-10	-8.5	dB
Comparator Level 2	Vc2		-6	-5	-4	dB
Comparator Level 3	Vc3	Point of adjustment		0		dB
Comparator Level 4	Vc4		2.5	3	3.5	dB
Comparator Level 5	Vc5		5	6	7	dB
LED Constant Current	I_{LED}		11	15	18.5	mA
Input Bias Current	I_{INO}		-1.0	-0.3		µA

Electrical Characteristics[LB1413N] at Ta=25°C,V_{CC}=6V,f=1kHz

			min	typ	max	unit
Current Dissipation	I_{CC}	V_{IN}=0		5	8	mA
Sensitivity	V_{IN}	Vc3 on-level	91	105	119	mVrms
Comparator Level 1	Vc1		0.28 ·Vc3	0.33 ·Vc3	0.40 ·Vc3	mVrms
Comparator Level 2	Vc2		0.59 ·Vc3	0.67 ·Vc3	0.75 ·Vc3	mVrms
Comparator Level 3	Vc3	Point of adjustment		VIN		mVrms
Comparator Level 4	Vc4		1.25 ·Vc3	1.33 ·Vc3	1.42 ·Vc3	mVrms
Comparator Level 5	Vc5		1.48 ·Vc3	1.67 ·Vc3	1.87 ·Vc3	mVrms
LED Constant Current	I_{LED}		11	15	18.5	mA
Input Bias Current	I_{INO}		-1.0	-0.3		µA

Electrical Characteristics[LB1423N] at Ta=25°C,V_{CC}=6V,f=1kHz

			min	typ	max	unit
Current Dissipation	I_{CC}	V_{IN}=0		5	8	mA
Sensitivity	V_{IN}	Vc3 on-level	74	85	96	mVrms
Comparator Level 1	Vc1		-11.5	-10	-8.5	dB
Comparator Level 2	Vc2		-6	-5	-4	dB
Comparator Level 3	Vc3	Point of adjustment		0		dB
Comparator Level 4	Vc4		2.5	3	3.5	dB
Comparator Level 5	Vc5		5	6	7	dB
LED Constant Current	I_{LED}		5	7	9.5	mA
Input Bias Current	I_{INO}		-1.0	-0.3		µA

Electrical Characteristics[LB1433N] at Ta=25°C,V_{CC}=6V,f=1kHz

			min	typ	max	unit
Current Dissipation	I_{CC}	V_{IN}=0		5	8	mA
Sensitivity	V_{IN}	Vc3 on-level	91	105	119	mVrms
Comparator Level 1	Vc1		0.28 ·Vc3	0.33 ·Vc3	0.40 ·Vc3	mVrms
Comparator Level 2	Vc2		0.59 ·Vc3	0.67 ·Vc3	0.75 ·Vc3	mVrms
Comparator Level 3	Vc3	Point of adjustment		VIN		mVrms

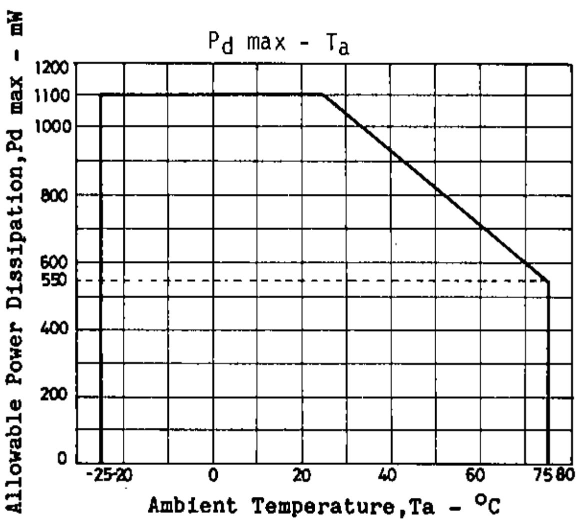
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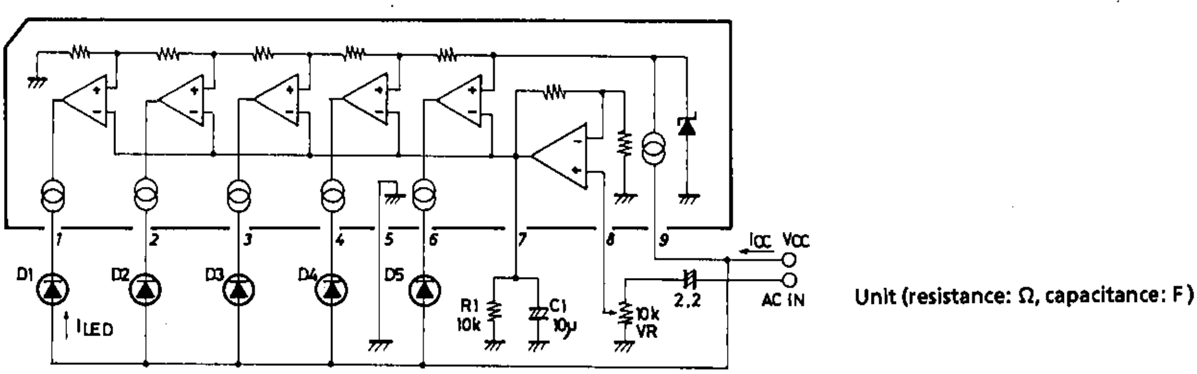
		min	typ	max	unit
Comparator Level 4	Vc4	1.25 ·Vc3	1.33 ·Vc3	1.42 ·Vc3	mVrms
Comparator Level 5	Vc5	1.48 ·Vc3	1.67 ·Vc3	1.87 ·Vc3	mVrms
LED Constant Current	I_{LED}	5	7	9.5	mA
Input Bias Current	I_{INO}	-1.0	-0.3		µA

Electrical Characteristics[LB1443N] at Ta=25°C,V_{CC}=6V,f=1kHz

			min	typ	max	unit
Current Dissipation	I_{CC}	V_{IN}=0		5	8	mA
Sensitivity	V_{IN}	Vc3 on-level	74	85	96	mVrms
Comparator Level 1	Vc1		-14	-12	-10	dB
Comparator Level 2	Vc2		-7	-6	-5	dB
Comparator Level 3	Vc3	Point of adjustment		0		dB
Comparator Level 4	Vc4		2.5	3	3.5	dB
Comparator Level 5	Vc5		5	6	7	dB
LED Constant Current	I_{LED}		11	15	18.5	mA
Input Bias Current	I_{INO}		-1.0	-0.3		µA



Sample Application Circuit and Test Circuit (AC input VU meter)



※ Capacitor to be omitted when used as a DC-input signal meter.

- C_1, R_1 time constant:
  The response time can be varied by varying the C_1, R_1 time constant (mainly the C_1 value).

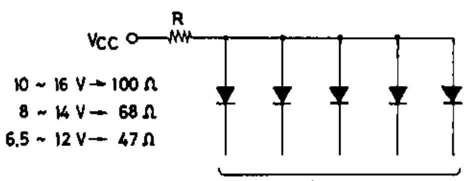
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When the C_1, R_1 time constant is larger:
.... The response time (attack time and release time) is made slower.
When the C_1, R_1 time constant is smaller:
.... The response time (attack time and release time) is made faster.

. Considerations relative to Pd max of the package:
Due to the constant current I_{LED}, most of the power consumed by the circuits is consumed within the IC.
When lighting the five LEDs continuously for a prolonged length of time, make sure that V_{CC} does not exceed:
LB1403N, 1413N, 1443N V_{CC}=9V
LB1423N, 1433N V_{CC}=14V
When using a higher power supply voltage, insert a resistor in series with the LEDs to restrain the power consumed within the IC package.

For LB1403N, 1413N, 1443N:



For LB1423N, 1433N:

